



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,707	02/18/2004	Michael Redecker	61610116US	8953
58027 7590 12/26/2007 H.C. PARK & ASSOCIATES, PLC 8500 LEESBURG PIKE SUITE 7500 VIENNA, VA 22182			EXAMINER MACCHIAROLO, PETER J	
			ART UNIT 2879	PAPER NUMBER
			NOTIFICATION DATE 12/26/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENT@PARK-LAW.COM

# Office Action Summary

Application No.

10/779,707

Applicant(s)

REDECKER ET AL.

Examiner

Peter J. Macchiarolo

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,8,10-13,18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,8,10-13,18 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/06/2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

The reply filed on 12/06/2007 consists of and remarks related to the prior rejection of claims in the Previous Office Action. The above have been entered and considered. Applicant's request for reconsideration of the rejection in the last Office action is persuasive and, therefore, the rejection is withdrawn. However, in light of newly found prior art, pending claims 1, 8, 10-13, 18, 19, and 24, with claim 24 being withdrawn, are not allowable as explained below.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 12/06/2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1, 8, 10-13, 18, and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding claim 1, the second to last clause of the claim recites the  $\text{LUMO}_{\text{emitter}}$  corresponds to, i.e. is equal to  $\text{LUMO}_{\text{HBL}}$ ; and  $\text{HOMO}_{\text{EBL}} = \text{HOMO}_{\text{EMIT}}$ . The last clause of the claim recites  $\text{LUMO}_{\text{emitter}} > \text{LUMO}_{\text{HBL}}$ ; and  $\text{HOMO}_{\text{EBL}} > \text{HOMO}_{\text{EMIT}}$ . It is not clear what the

claimed relationship is intended. It appears these are two different embodiments recited in a single claim. For the purpose of examination, the Examiner reads,  $LUMO_{emitter}$  corresponds to, i.e. is equal to  $LUMO_{HBL}$ ; and  $HOMO_{EBL} = HOMO_{EMIT}$ , as per the first embodiment. Claim 13 is likewise rejected.

Furthermore, the claim recites "a hole barrier layer and an electron barrier layer comprising phenylenediamine derivatives where the hole barrier layer..." It is not clear if both the HBL and the EBL both comprise phenylenediamine derivatives or if only the EBL comprises phenylenediamine derivatives. For the purpose of examination, the Examiner reads only the EBL comprises phenylenediamine derivatives. Claim 13 is likewise rejected.

The dependent claims are rejected due to their dependency.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 8, 10-13, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al (USPGPUB 20030059647: "Thompson") in view of Igarashi (USPGPUB 20010015432; "Igarashi").**

Regarding claims 1 and 13, Thompson discloses at least in the abstract, a display based on a photoluminescence quenching device (PQD), the display comprising: a substrate (see at least numbered paragraph 94); an emitter layer (see at least numbered paragraph 94); a first

electrode layer, which is transparent and is arranged on a front side of the emitter layer (see at least numbered paragraph 94); a second electrode layer, which is disposed on the backside of the emitter layer (see at least numbered paragraph 94); and a hole barrier layer (HBL) and an electron barrier layer (EBL), where the hole barrier layer and the electron barrier layer are respectively disposed between the emitter layer and one of the first electrode layer and second electrode layer (see at least numbered paragraph 94), wherein a highest occupied molecule orbital of the hole barrier layer is energetically lower than a highest occupied molecule orbital of the emitter layer (see at least paragraph 102) and a lowest unoccupied molecule orbital of the electron barrier layer is energetically higher than a lowest unoccupied molecule orbital of the emitter layer (see at least paragraph 105), wherein the lowest unoccupied molecule orbital of the emitter layer corresponds to the lowest unoccupied molecule orbital of the hole barrier layer (see at least paragraph 104) and the highest occupied molecule orbital of the electron barrier layer corresponds to the highest occupied molecule orbital of the emitter layer (see at least paragraph 107).

Although Thompson recites in at least paragraph 105 that any material may be used for the EBL, so long as it has difficulty acquiring electrons, it is not clear if the disclosure of Thompson discloses the EBL comprises phenylenediamine derivatives.

However, Igarashi teaches at least in paragraph 42 that a preferred material used in an electron blocking layer is phenylenediamine.

Further, it would have been obvious to one having ordinary skill in the art that the time the invention was made to use a phenylenediamine derivative, since it has been held to be within

the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Further evidence that using phenylenediamine is an obvious matter of design choice can be found in paragraph 29 of Applicant's published specification; "Appropriate material categories for the electron barrier layer 6 are amongst others triphenylamine derivatives, benzidine derivatives, and phenylenediamine derivatives." It appears that any known material can be used in Applicant's invention, since Applicant has not adequately disclosed any testing or analytical data which establishes criticality for using phenylenediamine, or recites any specific advantage the invention benefits from over the prior art from this modification. It appears that Thompson's EBL would perform equally well when comprising phenylenediamine.

Further, one would be motivated to use a phenylenediamine for a variety of reasons, including material availability and manufacturing processes with sensitive requirements.

Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the device of Thompson with the EBL comprising phenylenediamine to allow for a known material to properly block electrons.

The limitations, "whereby the first electrode layer forms a cathode and the second electrode forms an anode during re-emissive operation of the display, and the first electrode layer forms the anode and the second electrode forms a cathode during emissive operation of the display," are directed to the method of operating the device. Since the method of operating the device does not have any structural bearing on the overall device, these limitations have been

considered but not deemed patentable over Thompson, since the device of Thompson can be used in the fashion recited by Applicant.

Regarding claims 8 and 16, Thompson discloses at least in paragraph 109 that an energy difference between the highest occupied molecule orbital of the electron barrier layer and the lowest unoccupied molecule orbital of the electron barrier layer and an energy difference between the highest occupied molecule orbital of the hole barrier layer and the lowest unoccupied molecule orbital of the hole barrier layer each amount to at least about 3.3 eV.

Regarding claims 10 and 18, Thompson discloses in at least paragraphs 95 and 102 that the hole barrier layer comprises at least one compound selected from a group consisting of oxadiazole derivatives, oxazole derivatives, triazole derivatives and quinoxaline derivatives and/or at least one compound selected from a group consisting of naphthalene carboxylic acid imide derivatives, naphthalene dicarboxylic acid dimide derivatives and wide-bandgap inorganic semiconductors.

Regarding claims 11 and 19, Thompson discloses in at least paragraph 112 that the hole barrier layer is at least one of tin oxide, titanium oxide, zinc oxide, zirconium oxide, tantalum oxide, zinc sulphide and zinc selenide (page 3, lines 1-3).

Regarding claim 12, Thompson discloses at least in paragraph 94 that the hole barrier layer is disposed on a side of the emitter layer that faces towards the substrate and the electron barrier layer is disposed on a side of the emitter layer that faces away from the substrate.

***Response to Arguments***

Applicant's arguments filed 12/06/2007 have been fully considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (571) 272-2375. The examiner can normally be reached on 8:30 - 5:00, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571) 272-2475. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Application/Control Number:  
10/779,707  
Art Unit: 2879

Page 8

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Respectfully submitted,

By   
Peter Macchiarolo  
Patent Examiner, Art Unit 2879  
(571) 272-2375